Project Introduction

LignaMed, LLC is a drug development company with a fast track strategy to approval of LGM2605, an oral small molecule for use as a radiation mitigating agent that reduces harmful effects of radiation exposure of normal tissues. LignaMed aims to evaluate LGM2605 as a mitigator of space-radiation induced vascular damage. NASA missions to Mars will expose astronauts to solar and galactic cosmic mixed radiation including low dose γ and proton radiation, but data is lacking on the biological and physiological effects in humans of this mixed source radiation. Research on space radiation effects on cellular systems, molecular targets and ultimately organ systems has identified potential harmful short and long-term effects on the health of astronauts. Work at the University of Pennsylvania identified damage to lungs years after a single exposure to low-dose gamma, 56Fe, 28Si and proton radiation exposure in mice. Acute and chronic radiation effects in organs are closely associated with vascular damage and dysfunction. Multiple studies have confirmed single source radiation side effects associated with significant loss of vascular integrity: increased vascular leakiness (edema), an activated inflammatory phenotype and extensive oxidative damage. However, damage to the vascular network under multiple radiation types simultaneously is not understood. LignaMed will employ gene knockout technology in vascular models exposed to space-relevant mixed radiation regimens to investigate the injury to the vasculature. We hypothesize that LGM2605 will mitigate space radiation-induced vascular damage by inhibiting early events that cause inflammation. This study will confirm that 1) space radiation drives endovascular damage via activation of the endothelial inflammatory phenotype resulting in increased permeability and 2) will validate LGM2605 as an effective mitigator of space radiation-induced vascular damage by inhibiting early events that drive long term adverse sequellae.

LGM2605 as a mitigator of space radiation-induced vascular damage, Phase I Briefing Chart Image
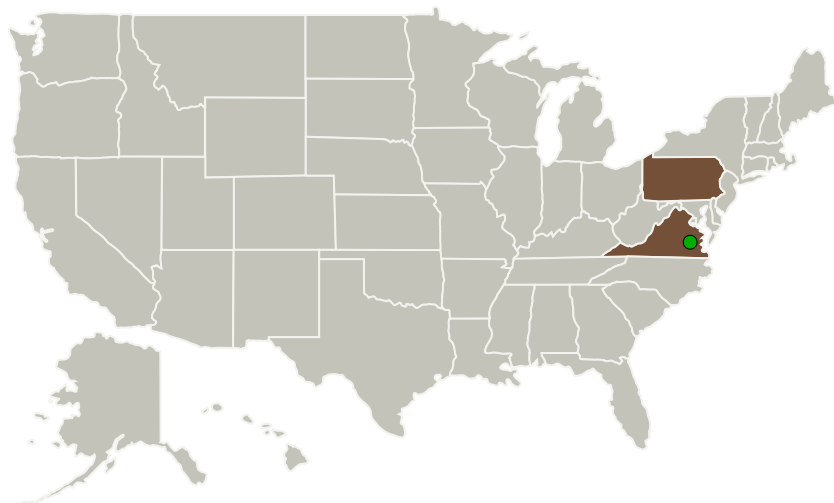
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Primary U.S. Work Locations and Key Partners

Organizations Performing Work	Role	Type	Location
LignaMed, LLC	Lead Organization	Industry	Philadelphia, Pennsylvania
● Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Pennsylvania	Virginia

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

LignaMed, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

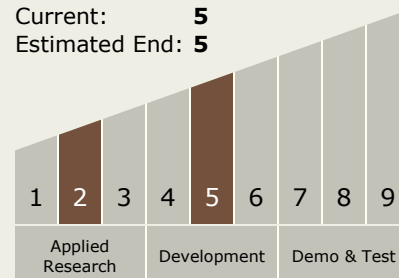**Program Director:**

Jason L Kessler

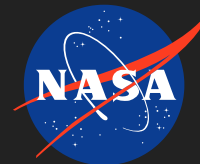**Program Manager:**

Carlos Torrez

Principal Investigator:

Thais Sielecki

Technology Maturity (TRL)

Start: **2**
Current: **5**
Estimated End: **5**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |

Applied Research | Development | Demo & Test

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Images

Briefing Chart Image
LGM2605 as a mitigator of space radiation-induced vascular damage, Phase I Briefing Chart Image
(https://techport.nasa.gov/imag e/136295)

Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  └ TX06.5 Radiation
    └ TX06.5.2 Radiation Mitigation and Biological Countermeasures